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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/786,790

02/25/2004

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CU-3608

3721

26530 7590 03/25/2008
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EXAMINER

ANDERSON, JAMES D

ART UNIT

PAPER NUMBER

1614

MAIL DATE

DELIVERY MODE

03/25/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/786,790	Applicant(s) KOBAYASHI, HIRONORI	
	Examiner JAMES D. ANDERSON	Art Unit 1614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5 and 22-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5 and 22-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>Machine Translation of JP 2000-053421</u> . |

DETAILED ACTION

Claims 5 and 22-27 are presented for examination

Applicants' amendment filed 12/28/2007 has been received and entered into the application. Accordingly, claim 5 has been amended, claims 1-4 and 6-21 have been cancelled, and claims 22-27 have been added.

Applicants' arguments have been fully considered but they are not deemed to be persuasive. Rejections and/or objections not reiterated from previous Office Actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

Response to Arguments

Applicant's arguments filed 12/28/2007 have been fully considered but they are not persuasive. In response to the Office Action mailed 8/2/2007, Applicants present the following arguments.

Applicants argue that Yoichi does not disclose a neutral sol solution of titanium oxide containing fluoroalkylsilane and further argue that there is no motivation in Yoichi to provide titanium oxide sol containing a fluoroalkylsilane. However, the Examiner notes that the secondary reference (Kobayashi) provides one skilled in the art with the means and motivation to combine titanium oxide and fluoroalkylsilane in a photocatalyst composition. As such, the combination of references teaches the limitations of the instant claims. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re*

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Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicants further argue that Kobayashi is silent regarding a coating solution for forming a pattern which forms the photocatalyst-containing layer. In response to applicant's argument that Kobayashi is silent regarding the intended use of the composition formed by the claimed process, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In this case, both Yoichi and Kobayashi are drawn to methods of preparing compositions useful as photocatalysts. However, the compositions formed by the combination of Yoichi and Kobayashi could also reasonably be used to form a wettability-varied pattern as instantly claimed because they contain the same components as recited in the claims.

Accordingly, the claims are deemed properly rejected as being obvious over Kobayashi in view of Yoichi for the reasons of record and as reiterated below. Applicants' addition of new claims 22-27 has resulted in a new ground of rejection as discussed below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5 and 22-27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kobayashi *et al.* (EP 0 932 081 A1; Published July 28, 1999) (cited by Applicant in IDS filed 4/12/2007) in view of Yoichi *et al.* (JP 2000-053421; Published February 22, 2000) (cited by Applicant in IDS filed 4/12/2007).¹

The claims are drawn to a method of producing a coating solution for forming a wettability-varied pattern, comprising mixing a neutral solution of titanium oxide, which contains titanium oxide and an alkyl silicate having the formula $\text{Si}_n\text{O}_{n-1}(\text{OR})_{2n+2}$, wherein R is an alkyl group, with a solution of hydrolyzed fluoroalkylsilane having the formula $\text{Y}_n\text{SiX}_{(4-n)}$, wherein Y is a fluoralkyl group, X is alkoxy, acetyl, or halogen, and n is 0 to 3, and wherein the pH of the coating solution is in a range of 5 to 9.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Kobayashi *et al.* teach methods of varying the wettability of layers on a substrate comprising applying a photocatalyst material (page 31, ¶ [0286]). The photocatalyst material is preferably titanium oxide (page 31, ¶ [0288]). The photocatalyst-containing layer may also contain a binder, preferably the instantly claimed polysiloxane containing a fluoroalkyl group,

¹ The Examiner herein provides a machine translation of Yoichi, which teaches the limitations of the newly added claims.

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specifically hydrolysis condensates of fluoroalkylsilanes (page 32, ¶ [0295]). It is noted that the polysiloxanes containing fluoralkyl groups listed on pages 32-33 meet the limitations of the claimed hydrolyzed fluoralkylsilanes (*e.g.*, $\text{CF}_3(\text{CF}_2)_3\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$). In fact, Kobayashi explicitly teaches organopolysiloxanes composed mainly of a hydrolysis condensate of compounds represented by formula $\text{Y}_n\text{SiX}_{(4-n)}$, wherein Y is an alkyl, fluoralkyl, vinyl, amino, or epoxy group, X is methoxy, ethoxy, acetyl, or halogen, and n is 1 to 3 ([0293]). Kobayashi teaches that the use of polysiloxanes containing fluoroalkyl groups as binders results in markedly improved water repellency and oil repellency of the photocatalyst-containing layer (page 33, ¶ [0296]). With respect to mixing a solution of titanium oxide and fluoroalkylsilicate as recited in claim 5, Kobayashi teaches that the photocatalyst (*e.g.*, titanium oxide) and binder (*e.g.*, fluoroalkylsilicate) are “dispersed in a solvent to prepare a coating liquid” ([0332]). The Kobayashi *et al.* reference does not teach a solution of titanium dioxide containing an alkyl silicate or that the solution is at a neutral pH.

However, Yoichi *et al.* teach methods of preparing a titanium oxide solution having superior dispersibility in a neutral pH range (Abstract). A titanium oxide solution is mixed with an alkyl silicate as a dispersion stabilizer and the resultant mixture is neutralized to prepare the objective titanium oxide solution (*id.*). With respect to the claimed alkyl silicates, Yoichi teaches alkyl silicates having the same structure as those claimed ([0009] of provided machine translation). With respect to the pH of 5 to 9 as recited in claim 5 and the claimed weight ratio of 0.7 to 10 as recited in claim 24, Yoichi teach the same pH range and weight ratio as claimed (Abstract; [0006] of provided machine translation). With respect to the diluting with a hydrophilic solvent as recited in newly added claims 26 and 27, Yoichi teaches that the titanium

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oxide sol and/or the alkyl silicate of the invention can be blended with a hydrophilic solvent and still maintain excellent dispersion stability ([0010] and [0014] of provided machine translation).

The titanium oxide/alkyl silicate solutions taught in Yoichi are further taught to be useful as photocatalysts ([0019] of provided machine translation). Yoichi does not teach adding a fluoroalkyl silane to the titanium oxide/alkyl silicate solutions taught therein.

However, it would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of mixing titanium oxide and an alkyl silicate at a neutral pH as taught in Yoichi *et al.*, to improve the dispersibility of the titanium oxide/fluoroalkylsilane-containing solutions of Kobayashi *et al.* The resulting coating solution would predictably have increased dispersibility at a neutral pH, which would clearly aid in applying said containing coating solutions to a substrate so as to induce varied wettability as taught in Kobayashi *et al.*

With respect to the pH of the solution of hydrolyzed fluoroalkylsilane solution (*i.e.*, 2 to 7) as recited in claim 22, Yoichi teach solutions of titanium oxide and alkyl silicates having a final pH of 5 to 9. As such, it would be obvious to adjust the pH of the fluoroalkylsilane solution such that addition of this solution to the titanium oxide and alkyl silicate solution of Yoichi would result in a final solution having a pH of 5 to 9. Further, as Applicant discloses, strongly acidic solutions of fluoroalkylsilane may change the dispersed state of the neutral solution of titanium oxide and destroy the state in which the titanium dioxide is dispersed in the solution (page 25).

With respect to the ratio of neutral sol solution of titanium oxide to the solution of hydrolyzed fluoroalkylsilane as recited in claim 23, no unobviousness is seen in varying the ratio

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of these solutions. While Kobayashi does not explicitly teach a ratio of titanium oxide to fluoralkylsilane, the reference does teach that the photocatalyst (*e.g.*, titanium oxide) in the photocatalyst-containing layer is preferably 5 to 60% by weight, more preferably 20 to 40% by weight ([0291]). Accordingly, it would have been obvious to add a binder such as a fluoralkylsilane as taught in Kobayashi in a range of 95 to 40% by weight, more preferably 80 to 60% by weight (*i.e.*, the remaining weight percentage), which amount falls within the ratio of 1:0.1 to 1 as recited in claim 23 (titanium oxide:fluoralkylsilane). It is noted that Example C-1 of Kobayashi provides a solution comprising 2 g of an inorganic coating composition for a photocatalyst and 0.3 g of a fluoroalkylsilane, *i.e.*, a ratio of 1:0.15 ([0562], and Example D-1 of Kobayashi provides a solution comprising 2 g titanium oxide and 0.15 g of a fluoroalkylsilane, *i.e.*, a ratio of 1:0.075 ([0595]).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES D. ANDERSON whose telephone number is (571)272-9038. The examiner can normally be reached on MON-FRI 9:00 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ardin Marschel can be reached on 571-272-0718. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James D Anderson/
Examiner, Art Unit 1614

/Ardin Marschel/
Supervisory Patent Examiner, Art Unit 1614